

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1       Claims 1-19 (canceled).

1       20. (previously presented) A method for establishing a  
2 desired transfer characteristic which converts an acoustical  
3 input signal impinging on a microphone arrangement into an  
4 electric output signal as a function of the angle at which  
5 said acoustical input signals impinge on said microphone  
6 arrangement, said method comprising the steps of:

7       providing at said microphone arrangement a first  
8            microphone sub-arrangement and a second microphone  
9            sub-arrangement, each microphone sub-arrangement  
10          having a transfer characteristic which converts said  
11          acoustical input signal impinging on said microphone  
12          sub-arrangements into an electric output signal of  
13          the respective sub-arrangement, said transfer  
14          characteristics of said first microphone sub-  
15          arrangements being different from said transfer  
16          characteristic of said second microphone sub-  
17          arrangement with respect to said acoustical input  
18          signal;

19       forming a ratio of said output signals of said first and  
20            second microphone sub-arrangements, thereby  
21            generating a ratio result;

22       forming a saturated product with said ratio result as one  
23          factor, thereby clipping said product at a  
24          predetermined or predeterminable value and  
25          generating a saturated product result; and  
26          generating said electric output signal as a function of  
27          said saturated product result.

1        21. (previously presented) The method of claim 20,  
2 further comprising the step of saturating said product on a  
3 maximum value.

1        22. (previously presented) The method of claim 20,  
2 further comprising the step of forming said saturated product  
3 with a second factor having an arbitrary value different from  
4 0.

1        23. (previously presented) The method of claim 20,  
2 wherein said function of said saturated product result  
3 comprises a difference function of a constant value and said  
4 saturated product result.

1        24. (previously presented) The method of claim 23,  
2 wherein said constant value is selected to be adjustable.

1        25. (previously presented) The method of claim 23,  
2 further comprising the step of saturating said saturated  
3 product on a saturation value and selecting said constant to  
4 be at least substantially equal with said saturation value.

1        26. (previously presented) The method of claim 20,  
2 further comprising the step of forming said ratio from the  
3 amplitude values of said output signals of said sub-  
4 arrangements.

1        27. (previously presented) The method of claim 20,  
2 further comprising generating said electric output signal  
3 according to the equation:

4

$$S = c_n \cdot \left\{ A - \left[ \alpha \cdot \frac{|c_z|}{|c_n|} \right]_{satB} \right\}$$

5 wherein:

6       S is said electric output signal,  
7       A is a predetermined or adjusted value,  
8       | $c_n$ | is the amplitude value of the output signal of one of  
9                said sub-microphone arrangements, the transfer  
10              characteristic of which has maximum gain for a value  
11              of said angle at which said desired transfer  
12              characteristic shall have maximum gain as well,  
13       | $c_z$ | is the amplitude value of the other of said at least  
14              two sub-microphone arrangements,  
15       satB is the saturation of the product [] to a  
16              predetermined or adjusted minimum or maximum value  
17              B, and  
18        $\alpha$  is a predetermined or adjustable factor.

1       28. (currently amended) The method of claim 20 further  
2 comprising the step of selecting said transfer characteristics  
3 of said at microphone sub-arrangements to have respectively a  
4 maximum gain for acoustical signal impinging on substantially  
5 opposite directions.

1       29. (previously presented) The method of claim 20,  
2 further comprising selecting said transfer characteristics of  
3 said microphone sub-arrangements to be generally of cardioid  
4 shape in polar diagram representation.

1       30. (previously presented) The method of claim 20,  
2 further comprising selecting said transfer characteristics of  
3 said microphone sub-arrangements to be generally of hyper-  
4 cardioid shape in polar diagram representation.

1       31. (previously presented) The method of claim 20 for  
2 establishing a desired transfer characteristic of a hearing

3 device.

1 32. (previously presented) The method of claim 20 for  
2 establishing a desired transfer characteristic for a hearing  
3 aid device.

1 33. (previously presented) A microphone arrangement  
2 comprising:

3 two microphone sub-arrangements each having an output,  
4 each of said microphone sub-arrangements also having  
5 a respective transfer characteristic with which  
6 acoustical input signal impinging on said microphone  
7 sub-arrangements are converted into respective  
8 electrical output signals at said outputs as a  
9 function of the angle at which said acoustical input  
10 signals impinge on said microphone sub-arrangements,  
11 said transfer characteristics of said microphone  
12 sub-arrangements being different with respect to  
13 said acoustical input signal;  
14 a computing unit having at least two inputs and an  
15 output, said outputs of said microphone sub-  
16 arrangements being respectively operationally  
17 connected to said inputs of said computing unit,  
18 said computing unit including:  
19 a ratio forming and weighing unit having an output,  
20 a denominator input, a numerator input and a  
21 weighing input, wherein  
22 one of said inputs of said computing unit is  
23 operationally connected to said denominator  
24 input, and wherein  
25 the other of said inputs of said computing unit is  
26 operationally connected with said numerator  
27 input, and further wherein

28           said ratio forming and weighing unit generates at  
29            said output an output signal saturated at a  
30            maximum and/or minimum value, the output of  
31            said ratio forming and weighing unit being  
32            operationally connected to the output of said  
33            microphone arrangement.

1           34. (previously presented) The arrangement of claim 33,  
2           wherein the output signal of said ratio forming and weighing  
3           unit is saturated on a maximum signal value.

1           35. (previously presented) The arrangement of claim 33,  
2           wherein said weighing input of said ratio forming and weighing  
3           unit is set with a signal representing a weighing factor  
4           different from zero which is predetermined or adjustable.

1           36. (previously presented) The arrangement of claim 33,  
2           wherein the output of said ratio forming and weighing unit is  
3           operationally connected to said output of said computing unit  
4           via a difference forming unit.

1           37. (previously presented) The arrangement of claim 36,  
2           wherein said difference forming unit has a first input  
3           operationally connected to the output of said ratio forming  
4           and weighing unit and has a second input for a predetermined  
5           or adjustable signal.

1           38. (previously presented) The arrangement of claim 37,  
2           wherein the value of said predetermined or adjustable signal  
3           is at least substantially equal to a value at which the output  
4           signal of said ratio forming and weighing unit is saturated.

1           39. (previously presented) The arrangement of claim 33,  
2           wherein said inputs of said computing unit are operationally

3 connected respectively to said denominator and numerator  
4 inputs of said ratio forming and weighing unit via magnitude  
5 forming units.

1 40. (previously presented) The arrangement of claim 33,  
2 wherein said output of said ratio forming and weighing unit is  
3 operationally connected to one input of a multiplication unit  
4 having at least two inputs and an output, the second input of  
5 said multiplication unit being operationally connected to the  
6 output of the microphone sub-arrangement, the output of which  
7 is operationally connected to said denominator input, said  
8 output of said multiplication unit being operationally  
9 connected to said output of said computing unit.

1 41. (previously presented) The arrangement of claim 36,  
2 wherein the output of said difference forming unit is  
3 operationally connected to an input of a multiplication unit  
4 having two inputs and an output, the second input being  
5 operationally connected to the output of the microphone sub-  
6 arrangement, the output of which is operationally connected to  
7 said denominator input, the output of said multiplication unit  
8 being operationally connected to the output of said computing  
9 unit.

1 42. (previously presented) The arrangement of claim 33  
2 further comprising time to frequency converter units  
3 interconnected between said outputs of said microphone sub-  
4 arrangements and said inputs of said computing unit.

1 43. (previously presented) The arrangement of claim 33,  
2 wherein said microphone sub-arrangements have respective  
3 transfer characteristics with a cardioid shape in polar  
4 representation.

1       44. (previously presented) The arrangement of claim 33,  
2 wherein said microphone sub-arrangements have respective  
3 transfer characteristics with a hyper-cardioid shape in polar  
4 representation.

1       45. (previously presented) The arrangement of claim 33  
2 being part of a hearing device.

1       46. (previously presented) The arrangement of claim 33  
2 being part of a hearing aid device.

1       47. (currently amended) A method for establishing a  
2 desired transfer characteristic which converts acoustical  
3 input signals impinging on a microphone arrangement into an  
4 electric output signal as a function of the angle at which  
5 said acoustical input signals impinge on said microphone  
6 arrangement, said method comprising the steps of:

7       providing at said microphone arrangement at least two  
8       microphone sub-arrangements, each microphone sub-  
9       arrangement having a transfer characteristic which  
10      converts said acoustical input signals impinging on  
11      said microphone sub-arrangements into an electric  
12      output signal of a respective sub-arrangement, said  
13      transfer characteristics of said at least two  
14      microphone sub-arrangements being different;  
15      forming a ratio of said output signals of said at least  
16      two sub-[[ - ]]]arrangements, thereby generating a  
17      ratio result;  
18      forming a saturated product with said ratio result as one  
19      factor, thereby performing saturating said product  
20      at a predetermined or predeterminable value and  
21      generating a saturated product result;

22 generating said electric output signal as a function of  
23 said saturated product result.

1 48. (previously presented) A microphone arrangement  
2 comprising:  
3 a first microphone sub-arrangement having a first output  
4 in the time domain having a first transfer  
5 characteristic with respect to an impinging acoustic  
6 signal;  
7 a second microphone sub-arrangement having a second  
8 output in the time domain having a second transfer  
9 characteristic with respect to an impinging acoustic  
10 signal, wherein  
11 said first transfer characteristic and said second  
12 transfer characteristic are different;  
13 a first time to frequency converter unit for converting  
14 said first output into a first frequency domain  
15 signal;  
16 a second time to frequency converter unit for converting  
17 said second output into a second frequency domain  
18 signal;  
19 a computing unit having a first input, a second input,  
20 and an output, wherein  
21 said frequency domain signals of said time to frequency  
22 converter units are connected to said inputs of said  
23 computing unit, respectively, wherein  
24 said computing unit generates a ratio signal that is  
25 proportional to an amplitude or an absolute value of  
26 one of said first and second frequency domain  
27 signals, and further wherein  
28 said ratio signal is inversely proportional to an  
29 amplitude or an absolute value of the other of said  
30 first and second frequency domain signals, and still  
31 further wherein

32        said ratio forming and weighing unit multiplies said  
33                ratio signal by a non-zero value to create a  
34                weighted ratio; and wherein  
35        said ratio forming and weighing unit generates a  
36                saturated signal by clipping said weighted ratio at  
37                a maximum and/or minimum value.

1        49. (previously presented) The microphone arrangement of  
2 claim 48, wherein said computer unit further generates a  
3 difference signal by subtracting said saturated signal from a  
4 constant.

1        50. (previously presented) The microphone arrangement of  
2 claim 49, wherein said computer unit further generates an  
3 output signal by multiplying said difference signal by one or  
4 the other of said first and said second frequency signals.

1        51. (previously presented) The microphone arrangement of  
2 claim 49, wherein said computer unit further generates an  
3 output signal by multiplying said difference signal by the  
4 other of said first and second frequency domain signals.

1        52. (previously presented) A method for establishing a  
2 desired transfer characteristic which converts an acoustical  
3 input signal impinging on a microphone arrangement into an  
4 electric output signal as a function of the angle at which  
5 said acoustical input signals impinge on said microphone  
6 arrangement, said method comprising the steps of:  
7                at said microphone arrangement providing:  
8                        a first microphone sub-arrangement having a transfer  
9                        characteristic which converts said acoustical  
10                      input signal impinging on said first microphone  
11                      into an output signal represented by  $c_n$ ; and

12        a second microphone sub-arrangement having a transfer  
13                characteristic which converts said acoustical input  
14                signal impinging on said second microphone into an  
15                output signal represented by  $c_z$ ; and  
16                generating said electric output signal according to the  
17                equation:

18

$$S = c_n \cdot \left\{ A - \left[ \alpha \cdot \frac{|c_z|}{|c_n|} \right]_{satB} \right\}$$

19        wherein:

20         $S$  is said electric output signal,  
21         $A$  is a predetermined or adjusted value,  
22         $|c_n|$  is the amplitude value of the output signal  $c_n$ ,  
23         $|c_z|$  is the amplitude value of the output signal  $c_z$ ,  
24         $satB$  is the saturation of the product [] to a  
25                predetermined or adjusted minimum or maximum value  
26                 $B$ , and  
27         $\alpha$  is a predetermined or adjustable factor.

1        53. (previously presented) The method of claim 52 wherein  
2        the transfer characteristic of the first microphone sub-  
3        arrangement has maximum gain for a value of said angle at  
4        which said desired transfer characteristic shall have maximum  
5        gain as well.

1        54. (previously presented) A microphone arrangement  
2        implementing the method of claim 52.

1        55. (previously presented) A microphone arrangement  
2        implementing the method of claim 53.